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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Takaaki Sorin

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07/25/2006

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EXAMINER

JUNG, UNSU

ART UNIT

PAPER NUMBER

1641

DATE MAILED: 07/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/774,327	Applicant(s) SORIN ET AL.	
	Examiner Unsu Jung	Art Unit 1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-15 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 April 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicants' amendments to the specification in the reply filed on April 18, 2006 have been acknowledged and entered.
2. Applicants' amendments to the drawings in the reply filed on April 18, 2006 have been acknowledged and entered.
3. Applicants' amendments to cancel claims 2, 16-38, and 74-101 and amend claims 1 and 3-15 drawings in the reply filed on April 18, 2006 have been acknowledged and entered. On p10, claims 16-101 are listed as being cancelled. However, the status of claims 102-110 is missing. A typo of cancelled claims 16-101 on p10 should be corrected to claims 16-110 as confirmed during a phone conversation with Ms. Rumore on June 30, 2006.
4. Claims 1 and 3-15 are pending.

Objections Withdrawn

5. Applicant's arguments, see p11, filed April 18, 2006, with respect to the objection of the drawings have been fully considered and are persuasive. The objection of the drawings with respect to Fig.'s 2, 4(a), 4(b), 4(c), 17, 18(a), 18(b), 18(c), 19, 33, 39, 51,

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and 52(b) has been withdrawn in light of the amended specification and drawings in the reply filed on April 18, 2006.

6. Applicant's arguments, see p11, filed April 18, 2006, with respect to the objection of the specification have been fully considered and are persuasive. The objection of the specification has been withdrawn in light of the amended specification in the reply filed on April 18, 2006.

7. Applicant's arguments, see p11, filed April 18, 2006, with respect to the objection of claims 4, 5, 80, and 81 have been fully considered and are persuasive. The objection of claims 4, 5, 80, and 81 has been withdrawn in light of the amended claims 4 and 5 and cancelled claims 80 and 81 in the reply filed on April 18, 2006.

Rejections Withdrawn

8. Applicant's arguments, see pp11-12, filed April 18, 2006, with respect to the rejection under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. The rejection of claims 1-15, 38, and 74-81 under 35 U.S.C. 112, second paragraph has been withdrawn in light of the amended claims 1 and 3-13 and cancelled claims 2, 38, and 74-81 in the reply filed on April 18, 2006.

9. Applicant's arguments, see p10, filed April 18, 2006, with respect to the rejection under 35 U.S.C. 103(a) as being unpatentable over Challener et al. (U.S. Patent No.

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5,994,150, Nov. 30, 1999) in view of Knoll (U.S. Patent No. 5,442,448, Aug. 15, 1995) and Malmqvist et al. (U.S. Patent No. 6,200,814, Filed Jan. 20, 1998) have been fully considered and are persuasive. The rejection of claim 81 under 35 U.S.C. 103(a) as being unpatentable over Challener et al in view of Knoll and Malmqvist et al. has been withdrawn in light of the cancelled claim 81 in the reply filed on April 18, 2006.

10. Applicant's arguments, see p13, filed April 18, 2006, with respect to the rejection under 35 U.S.C. 103(a) as being unpatentable over Challener et al. (U.S. Patent No. 5,994,150, Nov. 30, 1999) in view of Malmqvist et al. (U.S. Patent No. 6,200,814, Filed Jan. 20, 1998) have been fully considered and are persuasive. The rejection of claim 12 under 35 U.S.C. 103(a) as being unpatentable over Challener et al in view of Malmqvist et al. has been withdrawn in light of the amended claim 1 in the reply filed on April 18, 2006.

Drawings

11. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: reference numbers "ω1" and "ω2" in Fig. 32. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the

immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

12. Claim 12 is objected to because of the following informalities: a comma is needed following the word "direction" in line 8. Appropriate correction is required.

Claim Rejections - 35 USC § 112

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claims 1 and 3-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

15. In claim 1, the term "a predetermined reference plane" in line 10 is vague and indefinite. It is not clear how the term "a predetermined reference plane" is structurally related to the elements of the surface plasmon resonance sensor chip.

16. The term "concentrated" in claim 8 is a relative term which renders the claim indefinite. The term "concentrated" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The limitation of "said diffraction grating surfaces are concentrated" has been rendered indefinite by the use of the term "concentrated."

17. In claim 13, the phrase "non-diffraction areas one with each said diffraction area" is vague and indefinite. It is unclear what the phrase "non-diffraction areas one with each said diffraction area" means. For the purpose of examination, the phrase has been interpreted in light of the specification (Fig. 12) as being "A surface plasmon resonance sensor chip as defined in claim 8, further comprising a plurality of non-diffraction areas, wherein each of the non-diffraction area is associated with each of the said diffraction area."

18. The term "concentrated" in claim 13 is a relative term which renders the claim indefinite. The term "concentrated" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The limitation of "non-diffraction surfaces concentrated" has been rendered indefinite by the use of the term "concentrated."

New Grounds of Rejections

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

21. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

22. Claims 1, 3-9, 11, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener et al. (U.S. Patent No. 5,994,150, Nov. 30, 1999) in view of Knoll (U.S. Patent No. 5,442,448, Aug. 15, 1995).

Challener et al. anticipates instant claims by teaching a surface plasmon resonance chip comprising a metal layer along whose surface a surface plasmon wave can be induced by light irradiation (column 3, lines 11-13) and a plurality of diffraction grating surfaces that are disposed in the vicinity of the metal layer and on each of which a diffraction grating with a uniform groove orientation and a uniform groove pitch is formed to generate an evanescent wave upon light irradiation (Fig. 8), wherein the diffraction grating surfaces are perpendicular to a specific plane, which is perpendicular to the predetermined reference plane, and form a predetermined inclination angle with the reference plane, and on each said diffraction grating surface, the diffraction grating is formed in such a manner that the groove orientation is perpendicular to the specific plane (Fig. 8). However, Challener et al. fails to teach a surface plasmon resonance sensor chip, wherein the plural diffraction grating surfaces are positioned in decreasing order to inclination angle (different inclination angles) that each said diffraction grating surface forms with the reference plane.

Knoll teaches a grating structure designed in a multidiffractive fashion (diffraction grating surfaces are positioned in decreasing order to inclination angle that each said

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diffraction grating surface forms with the reference plane, Fig. 6) for laterally resolved detection of a change in the layer thickness of the object layer which results from a specific binding reaction of a first binding partner bound to the object layer with an unbound second binding partner (Abstract). These measures allow to observe investigation region of the object layer, as in normal optical microscopy and as a result, the measurement technique is simplified and at the same time the conditions of the optical imaging of the investigation region are improved (column 5, lines 54-59).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the surface plasmon resonance sensor chip of Challenger et al. with diffraction grating surfaces are positioned in decreasing order to inclination angle that each said diffraction grating surface forms with the reference plane as taught by Knoll in order to observe investigation region of the object layer, as in normal optical microscopy and as a result, the measurement technique is simplified and at the same time the conditions of the optical imaging of the investigation region are improved.

With respect to claims 4 and 5, Knoll teaches a surface plasmon resonance sensor chip, wherein each said diffraction grating surface has a minimum width with one groove alone and the aggregate of the diffraction grating surfaces forms a curved surface in an arc shape whose light-irradiated side bulges out (Fig. 6).

With respect to claim 6, Challenger et al. teaches the surface plasmon resonance sensor chip of claim 2, wherein each said diffraction grating surface is formed along a sensor surface, which comes in contact with a sample, and on the sensor surface, a

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binding substance that binds specifically to a target species in the sample is immobilized for each said diffraction grating surface (column 11, lines 43-45).

With respect to claim 7, Challener et al. teaches the surface plasmon resonance sensor chip of claim 6, wherein two or more kinds of binding substances are immobilized for each said diffraction grating surface (column 11, lines 43-45).

With respect to claim 8, Challener et al. teaches a surface plasmon resonance sensor chip, further comprising a plurality of diffraction areas, within each of which said diffraction grating surfaces are concentratedly disposed (column 11, lines 43-45) and Knoll teaches that the plural diffraction grating surfaces in each of the said diffraction areas have different inclination angles (Fig. 6):

With respect to claim 9, Challener et al. teaches a surface plasmon resonance sensor chip, wherein each said diffraction grating surface is formed along a sensor surface, which comes in contact with a sample, and on the sensor surface, a binding substance that binds specifically to a target species in the sample is immobilized for each said diffraction grating surface (column 11, lines 43-45).

With respect to claim 11 and 14, Knoll teaches a surface plasmon resonance sensor chip, wherein each of one or more diffraction grating surface has a reaction area, within which the binding substance is immobilized, and a non-reaction area, within which a substance that does not bind to any target species in the sample is immobilized, or alternatively, any substance is not immobilized (column 1, lines 6-13).

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23. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Challener et al. (U.S. Patent No. 5,994,150, Nov. 30, 1999) in view of Knoll (U.S. Patent No. 5,442,448, Aug. 15, 1995) as applied to claim 6 above, and further in view of Malmqvist et al. (U.S. Patent No. 6,200,814, Filed Jan. 20, 1998).

Challener et al. teaches a surface plasmon resonance sensor chip as discussed above. However, Challener et al. fails to teach a surface plasmon resonance sensor chip, further comprising a cover for covering the sensor surface and a plurality of flow channels formed side by side between the sensor surface and the cover to pass along the direction, in which the diffraction grating surfaces are arranged.

Malmqvist et al. teaches a device for laminar flow on a sensing surface (Abstract) with a cover for covering the sensing surface (Fig. 11B) for use with optical detection methods such as surface plasmon resonance (column 7, lines 41-47). Malmqvist et al. teaches a method of controlling a fluid flow over a sensing surface using laminar flow technique to bring the fluid (also referred to as "sample flow") into contact with one or more discrete areas on the sensing surface, as well as to prepare sensing surfaces (column 7, lines 20-35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the surface plasmon resonance sensor chip of Challener et al. with a device for laminar flow on a sensing surface with a cover for covering the sensing surface as taught by Malmqvist et al. in order to bring the fluid (also referred to as "sample flow") into contact with one or more discrete areas on the sensing surface, as well as to prepare sensing surfaces.

24. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Challener et al. (U.S. Patent No. 5,994,150, Nov. 30, 1999) in view of Knoll (U.S. Patent No. 5,442,448, Aug. 15, 1995) as applied to claim 8 above, and further in view of Malmqvist et al. (U.S. Patent No. 6,200,814, Filed Jan. 20, 1998).

Challener et al. in view of Knoll teaches a surface plasmon resonance sensor chip as discussed above. However, Challener et al. in view of Knoll fails to teach a surface plasmon resonance sensor chip, further comprising a cover for covering the sensor surface and a plurality of flow channels formed side by side between the sensor surface and the cover so as to pass along the direction, in which the diffraction grating surfaces are arranged.

Malmqvist et al. teaches a device for laminar flow on a sensing surface (Abstract) with a cover for covering the sensing surface (Fig. 11B) for use with optical detection methods such as surface plasmon resonance (column 7, lines 41-47). Malmqvist et al. teaches a method of controlling a fluid flow over a sensing surface using laminar flow technique to bring the fluid (also referred to as "sample flow") into contact with one or more discrete areas on the sensing surface, as well as to prepare sensing surfaces (column 7, lines 20-35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the surface plasmon resonance sensor chip of Challener et al. in view of Knoll with a device for laminar flow on a sensing surface with a cover for covering the sensing surface as taught by Malmqvist et al. in order to bring

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the fluid (also referred to as "sample flow") into contact with one or more discrete areas on the sensing surface, as well as to prepare sensing surfaces.

Allowable Subject Matter

25. Claims 10 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

26. The following is a statement of reasons for the indication of allowable subject matter: Challener et al. teaches a surface plasmon resonance sensor chip as discussed above. However, Challener et al. fails to teach a surface plasmon resonance sensor chip, further comprising a plurality of non-diffraction grating surfaces, which do not have any diffraction grating, wherein each of the non-diffraction grating surfaces is disposed along the sensor surface in the same plane with the respective one of the diffraction grating surfaces.

Response to Arguments

27. Applicant's arguments with respect to claims 1 and 3-15 have been considered but are moot in view of the new ground(s) of rejection. The following arguments, however, have been addressed as they may also apply to the current rejection.

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28. In addition to including limitations of claim 2, the amended claim 1 further includes a limitation of having plurality of diffraction grating surfaces forming different inclination angles as recited in currently amended claim 1. Challener et al. fails to teach this limitation. However, Knoll teaches a grating structure designed in a multidiffractive fashion, wherein the diffraction grating surfaces are positioned in decreasing order to inclination angle that each said diffraction grating surface forms with the reference plane as discussed above. Therefore, the combined teachings of Challener et al. and Knoll teaches all the limitations of currently recited claim 1 as discussed above.

Conclusion

29. No claim is allowed.

30. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Unsu Jung whose telephone number is 571-272-8506. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Unsu Jung, Ph.D.
Patent Examiner
Art Unit 1641


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